Space Weather Forecast

Issued on Monday, 12 August 2024 at 01:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1-G2/Minor to Moderate geomagnetic storms likely initially with ongoing Coronal Mass Ejection (CME) arrivals. Further Moderate-class flares expected with a chance of isolated Strong flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with the largest flare a Moderate flare originating from AR3777 in the western disk at 11/2018UTC. There are now eleven sunspot regions visible on the disc. AR3780 remains very large, displaying a complex magnetic structure. AR3786, AR3787 and AR3788 were numbered but remained small and the bulk of regions appear generally stable.

No Earth-directed coronal mass ejections (CME) were observed in available imagery.

Solar Wind / Geomagnetic Activity: Slightly elevated solar wind conditions at 450-500km/s, have been observed throughout following continued CME influence which began at approximately 10/1205UTC. A second CME arrival was likely observed approximately 11/2000UTC which saw winds rise to become more persistently 500-520km/s. The Interplanetary Magnetic Field, Bt, was generally moderate to strong. The north-south component, Bz, was mostly positive, but with periods of moderate to strongly negative Bz between 11/0500-0800UTC and 11/2200-233000UTC. Geomagnetic activity was Quiet to Active (Kp2-4) but one Kp5/G1 minor geomagnetic storm interval recorded.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High solar activity is forecast, with occasional Moderate-class flares expected and a slight chance of isolated Strong-class flares.

Solar Wind /Geomagnetic Activity: Continued impacts from one or more CMEs that left the Sun on the 7th and a further CME associated with a strong flare on the 8th expected to continue into Day 1 (12 Aug). Another CME in association with a moderate flare on the 9th produced a CME also forecast to have an Earth-directed component, with analysis suggesting an arrival early on Day 2 (13 Aug). This arrival may be coincident with a further CME which was observed in association with another moderate flare from the 10th. The interaction of these two CMEs acting to lower confidence in arrival time significantly.

Geomagnetic activity is expected to be mostly Unsettled to Active (Kp3-4) initially, with occasional G1-G2/Minor to Moderate Storming (Kp5-6) intervals likely in association with continued CME arrivals, and a slight chance of G3/Strong (Kp7) storming. This risk decreases going into Day 3 and 4 (14-15 Aug), with activity expected to decline towards Quiet to Unsettled

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levels (Kp2-3) but further CME influence remains possible.

Energetic Particles / Solar Radiation: A heightened risk of flare activity brings the slight chance of reaching or exceeding Minor Radiation Storm levels should any significant flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	90	80	40	20
Strong	G3	No	15	10	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	90	85	80	75
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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